

## Instruction Manual

HAS8xE-IM-ATEX

08/2004

# Instruction Manual

BINOS 100 F & MLT 2

Addendum for Pressurized Analyzers

intended to be used in

Hazardous Areas classified Zone 2

3<sup>rd</sup> Edition 08/2004



**ROSEMOUNT**<sup>®</sup>  
Analytical

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Process Management

## ESSENTIAL INSTRUCTIONS

### READ THIS PAGE BEFORE PROCEEDING!

Emerson Process Management (Rosemount Analytical) designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you **MUST properly install, use, and maintain them** to ensure they continue to operate within their normal specifications. The following instructions **MUST be adhered to** and integrated into your safety program when installing, using and maintaining Emerson Process Management (Rosemount Analytical) products. Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.

- **Read all instructions** prior to installing, operating, and servicing the product.
- If you do not understand any of the instructions, **contact your Emerson Process Management (Rosemount Analytical) representative** for clarification.
- **Follow all warnings, cautions, and instructions** marked on and supplied with the product.
- **Inform and educate your personnel in the proper installation, operation, and maintenance of the product.**
- **Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes.** Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, **use qualified personnel** to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Emerson Process Management (Rosemount Analytical). Unauthorized parts and procedures can affect the product's performance, place the safe operation of your process at risk, **and VOID YOUR WARRANTY.** Look-alike substitutions may result in fire, electrical hazards, or improper operation.
- **Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.**

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1<sup>st</sup> Edition 11/2003      2<sup>nd</sup> Edition 01/2004

3<sup>rd</sup> Edition 08/2004

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**Emerson Process Management**  
**GmbH & Co. OHG**  
Industriestrasse 1  
D-63594 Hasselroth  
Germany  
T +49 (0) 6055 884-0  
F +49 (0) 6055 884-209  
Internet: [www.EmersonProcess.com](http://www.EmersonProcess.com)



## **PREFACE**

**The purpose of this manual is to provide additional information concerning the components, functions, installation and maintenance of EEx p pressurized MLT 2 and BINOS® 100 F analyzers intended to be installed and operated at hazardous locations, classified Zone 2, to measure FLAMMABLE, but NON-EXPLOSIVE gases or gas mixtures.**

**The user should become thoroughly familiar with the operation of this equipment before operating it.**

**Some sections may describe equipment not used in your configuration.**

**This ATEX instruction manual is a supplement to the analyzers standard instruction manual! In addition to this manual, the manuals of all devices necessary for operating the system must be observed. Read all manuals completely to be familiar with the operation of this equipment at hazardous locations.**

**Some technical specifications in this manual may be different to those in the associated manuals for the analyzers and additional equipment. In this case the technical specifications listed in this manual are valid only.**

## DEFINITIONS

The following definitions apply to WARNINGS, CAUTIONS and NOTES found throughout this publication.

### **WARNING**

Highlights an operation or maintenance procedure, practice, condition, statement, etc. If not strictly observed, could result in injury, death, or long-term health hazards of personnel.

### **CAUTION**

Highlights an operation or maintenance procedure, practice, condition, statement, etc. If not strictly observed, could result in damage to or destruction of equipment, or loss of effectiveness.

### **NOTE**



Highlights an essential operating procedure, condition or statement.

**IMPORTANT**  
**SAFETY INSTRUCTIONS**

**SAFETY SUMMARY**

If this equipment is used in a manner not specified in these instructions, protective systems may be impaired.

**WARNING**

PRODUCTS DESCRIBED IN THIS MANUAL SHALL NOT BE SUPPLIED WITH EXPLOSIVE GASES!

**WARNING**

PRODUCTS DESCRIBED IN THIS MANUAL ARE NOT DESIGNED FOR USE IN ANY LIFE SUPPORT AND/OR SAFETY EQUIPMENT WHERE FAILURE TO PERFORM CAN REASONABLY BE EXPECTED TO RESULT IN PERSONAL INJURY OR DEATH.

**AUTHORIZED PERSONNEL**

To avoid loss of life, personal injury and damage to this equipment and on-site property, do not operate or service this instrument before reading and understanding this instruction manual and receiving appropriate training.  
**SAVE THESE INSTRUCTIONS.**

## TERMS USED IN THIS MANUAL

### **ATEX**

Directive 94/9/EC, commonly called the ATEX („Atmosphères Explosibles“) products directive.

### **Area Classification**

#### **Zone 1**

Where ignitable concentrations of flammable gases can exist some of the time under normal operating conditions.

(A guideline value [not part of a standard ] is 10 to 1.000 hours per year.)

Equipment to be used in Zone 1 has to be classified Category 2.

#### **Zone 2**

Where ignitable concentrations of flammable gases are not likely to exist under normal operating conditions.

(A guideline value [not part of a standard ] is less than 10 hours per year.)

Equipment to be used in Zone 2 has to be classified Category 3.

### **Explosion Protection**

#### **External Explosion Protection**

The „External explosion protection“ serves to prevent penetration of explosive gas mixtures into the analyzer enclosure. In addition it avoids ignition on the surface. For this reason the analyzer is purged with protective gas and held at an internal overpressure compared to the surrounding atmosphere.

#### **Internal Explosion Protection**

The „Internal explosion protection“ serves to prevent ignition of gas being present in the analyzer's Containment System (CS;= sample gas path).

Dependent on the gas composition several options are available:

None required (if gas is noncombustible), dilution by purge gas or/and internal overpressure of the analyzer's enclosure compared to the CS.

### **Containment System**

The part of the analyzer containing the gas that may constitute an internal source of release.

#### **Lower Explosion Limit (LEL)**

Volume ratio of flammable gas in air below which an explosive gas atmosphere will not be formed: the mixture of gas and air lacks sufficient fuel (gas) to burn.

#### **Upper Explosion Limit (UEL)**

Volume ratio of flammable gas in air above which an explosive gas atmosphere will not be formed: the mixture of gas and air is too rich in fuel (deficient in oxygen) to burn.

**Terms used in this manual**

**Flammable Gas(es)**

Gases and gas mixtures are assigned to be flammable if they might become ignitable when in a mixture with air.

**Explosive Gas(es)**

Gases and gas mixtures are assigned to be explosive if they consist of a flammable gas in a mixture with air and the concentration is in between the explosive limits.

**Protective Gas**

Air or inert gas used for purging and maintaining an overpressure and, if required, dilution.

**Dilution**

The continuous supply of a protective gas, after purging, at such a rate that the concentration of a flammable mixture inside the pressurized enclosure is maintained at a value outside the explosive limits except in a dilution area.

**Pre-Purging**

The pre-purging phase serves to remove any combustible gas out of the analyzer's enclosure prior to switching on the analyzer. During this time the housing is purged with 5 times its own volume.

**Pressurization Modes**

**Pressurization mode „Continuous Flow“**

In EEx p „continuous flow mode“ the protective gas flows with higher rates through the enclosure. Flow rates are calculated to hold an overpressure of  $\geq 1$  mbar compared to atmospheric.

**Pressurization mode „Leakage Compensation“**

In EEx p „leakage compensation mode“ just as much protective gas is used to hold an overpressure of  $\geq 1$  mbar compared to atmospheric.





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## SECTION 1

### Technical Description

#### 1-1 Application and Principle of Operation

The gas analyzers of type BINOS® 100 F and MLT 2 are intended to measure gas components within gas mixtures. In combination with an appropriate certified purge system (protection method „Pressurized Enclosure“ EEx p) they can be installed and operated in hazardous areas of Zone 2.

Pressurization acts as external explosion protection and prevents external explosive atmosphere to penetrate into the analyzer by holding the enclosure at an overpressure compared to the surrounding

The type of purge system used varies dependent on the area where the analyzer is intended to be installed. Both systems offer two modes of operation:

- EEx p with continuous flow and
- EEx p with leakage compensation.

Dependent on the sample gas composition it may be necessary to take care of internal explosion protection which refers to the sample gas path (containment system) in the analyzer.

One of the following protection methods is used:

- **Nonflammable gases and gas mixtures** below the LEL: It must be ensured that the sample gas in the containment system always remains below the lower explosive limit!

- **Flammable gases and gas mixtures** may be analyzed when the sample gas is diluted below  $\frac{1}{4}$  LEL outside the analyzer, so the resulting sample gas is to be categorized „nonflammable“. The diluting system must ensure that the gas in the containment system always remains below  $\frac{1}{4}$  LEL.

- **Flammable gases and gas mixtures** may be analyzed when the analyzer enclosure has an internal overpressure of  $\geq 50$  Pa over the pressure in the containment system. To ensure this condition a differential pressure switch is used and connected between containment system and analyzer enclosure. In case the pressure decreases below the level of 50 Pa the switch is activated and may be used to activate an alarm or analyzer shut-off.

If more than one switch is needed because more than one flammable gas is supplied to the analyzer, the contacts of these switches have to be connected in series. Purge medium may be inert gas or air. Flame arrestors are required for all gas inlets and outlets carrying flammable gases.

- **Explosive gases must not be connected to the analyzer!**

# MLT 2 / BINOS<sup>®</sup> 100 F

## 1-2 Instrument Layout

**1-2 Unused**

**1-3 Specification**

**1-3 Specification**

**1-3-1 Installation Site**

Hazardous area: Zone 2 (Category 3),

**1-3-2 Explosion Protection**

**Concepts:**

Category 3: Pressurized enclosure (EEx p) using simplified purge with either leakage compensation mode or continuous flow

**Temperature class:** T4

**Options:** Intrinsically safe (EEx i) digital, analog, network or Foundation Fieldbus outputs.

Intrinsically safe (EEx i) paramagnetic Oxygen sensor or thermal conductivity sensor.

**Applicable Standards:**

EN 50014:1997 + amendments 1 & 2,  
EN 50016:1995,  
EN 50020:1994

**1-3-3 Pressurization Conditions**

**Volume of pressurized enclosure:**

single enclosure: approx. 56 l  
dual enclosure: approx. 112 l

**Flow of protective gas:**

single enclosure: 8 Nm<sup>3</sup>/h  
dual enclosure: 7 Nm<sup>3</sup>/h

**Pre-purge phase:**

Duration:  
single enclosure: 5 minutes  
dual enclosure: 17 minutes

**Minimum overpressure during operation:**

1 mbar against external Ex Zone and  
≥50 Pa against Containment System if flammable gases are supplied.

MLT 2 / BINOS<sup>®</sup> 100 F

## 1-3-4 Purge Gas Conditions

## 1-3-4 Purge Gas Conditions

- Purge gas:                   • Inert gas (e.g. Nitrogen)  
                                   • Air (from an ex-free zone)
- Temperature:               As ambient, but **min. 20 °C to 35 °C.**



**Medium has to be dry and free from dust, oil, corrosive or aggressive components!**

- Input pressure at inlet of EEx p device:   • 3,000 to 4,000 hPa (3 to 4 bar)

- Minimum internal overpressure of the enclosure:       • 1 mbar

- Maximum internal overpressure of the enclosure:       • 25 mbar

<b>Pre-purging phase</b>	Single enclosure analyzer	Dual enclosure analyzer
Duration of pre-purging phase:	5 min.	17 min.
Flow rate during pre-purging phase:	8 Nm <sup>3</sup> /h (= 133.4 l/min.)	7 Nm <sup>3</sup> /h (= 117 l/min.)
Flow rate during pre-purging phase (@ 25 mbar overpressure):	22 Nm <sup>3</sup> /h (= 367 l/min.)	22 Nm <sup>3</sup> /h (= 367 l/min.)

**1-3-5 Sample Gas Conditions**

**1-3-5 Sample Gas Conditions**

Applicable gases:	Nonflammable gases or gas mixtures which always remain below LEL	Flammable gases
Maximum sample gas pressure:	atmospheric or <1500 hPa at normal atmospheric pressure, depend on gas measuring principle	atmospheric or <1500 hPa at normal atmospheric pressure, depend on gas measuring principle  <b>and</b> overpressure ≤ 13 mbar against surrounding atmosphere
Sample gas flow:	for all sample gases refer to the corresponding analyzer data sheet	

**1-3-6 Differential Pressure Monitoring**

For analyzers connected to flammable gases (either sample gas or span gas) the operator needs to ensure that the pressure within the containment system always remains at minimum 50 Pa below the pressure within the analyzer enclosure. This ensures that in case of a leak the flammable gas does not enter the enclosure.

An additional differential pressure switch is provided to monitor the pressure difference: In case the pressure difference decreases below 50 Pa the contact opens.

It is the user's responsibility how to use the signal within his system:

The limit of 50 Pa is the least permissible value given by the standards, higher values are acceptable, too.

Flame arrestors are required for gas inlets and outlets.

Electrical and mechanical connections are shown in section 2 „Installation“.

**MLT 2 / BINOS<sup>®</sup> 100 F****1- Additional Safety Measures****1-4 Additional Safety Measures**

- Exhaust gas lines must end outside the hazardous area at a safe point. Sample gas lines may be returned to the sampling point.
- If gas exhaust lines end within the hazardous area gas inlet and outlet have to be equipped with flame arrestors.
- The maximum permissible gas pressure depends on the type of connected gas. See section 1-3-5 for detailed information.



## **SECTION 2**

### **Installation**

#### **WARNING**

**Before starting to install this equipment, read the corresponding sections of the analyzer's instruction manual and the manuals of the additional equipment!  
Failure to follow the safety instructions could result in serious injury or death.**

#### **2-1 General**

Proper functioning of the Emerson Process Management gas analyzers depends on proper installation. All procedures in this section, in the corresponding sections of the analyzer instruction manual and the manuals of the attached safety devices must be followed carefully.

#### **2-2 Installation of the Unit**

Install the assembled unit as described in the analyzer's instruction manual: Refer to the dimensional drawings in this manual (fig. 2-1a/b and 2-2a/b) to ensure the designated location is dimensioned sufficiently.

The weight of an assembled unit may be up to approx. 40 kg incl. pressurization system.

#### **CAUTION**

**Take care to use anchors and bolts specified to be used for the weight of the units!**

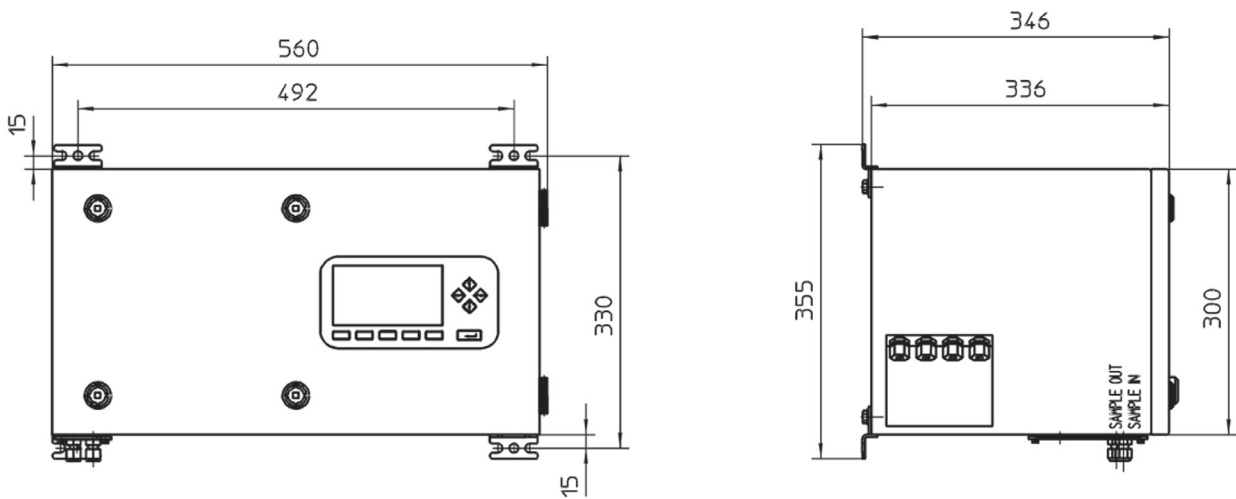
**Take care the wall the unit is intended to be installed at is solid and stable to hold the units!**

MLT 2 / BINOS® 100 F

2-3 Dimensional Drawings

2-3 Dimensional Drawings

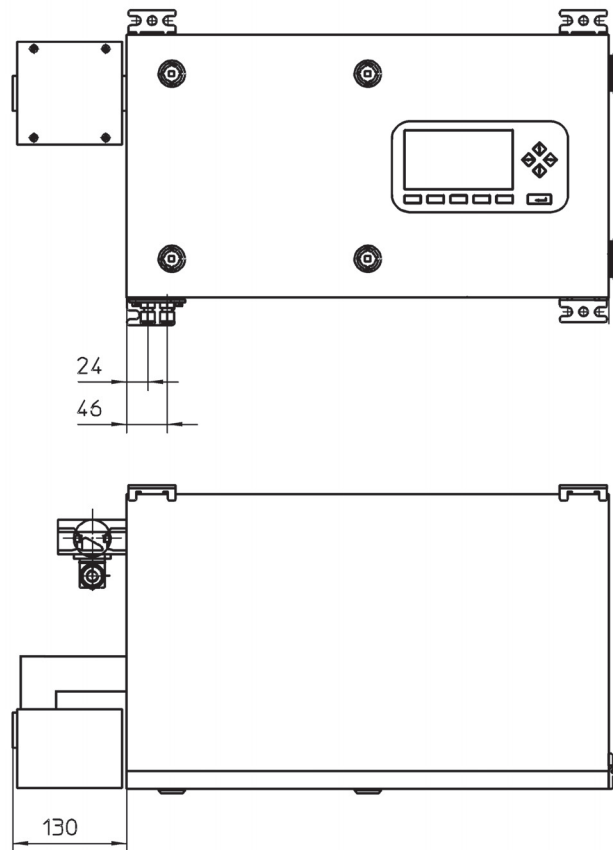
2-3-1 Single Enclosure Analyzer



Standard version w/o pressurization system

**Fig. 2-1a**  
Single enclosure analyzer (dimensions in mm)

**2-3-1 Single Enclosure Analyzer**



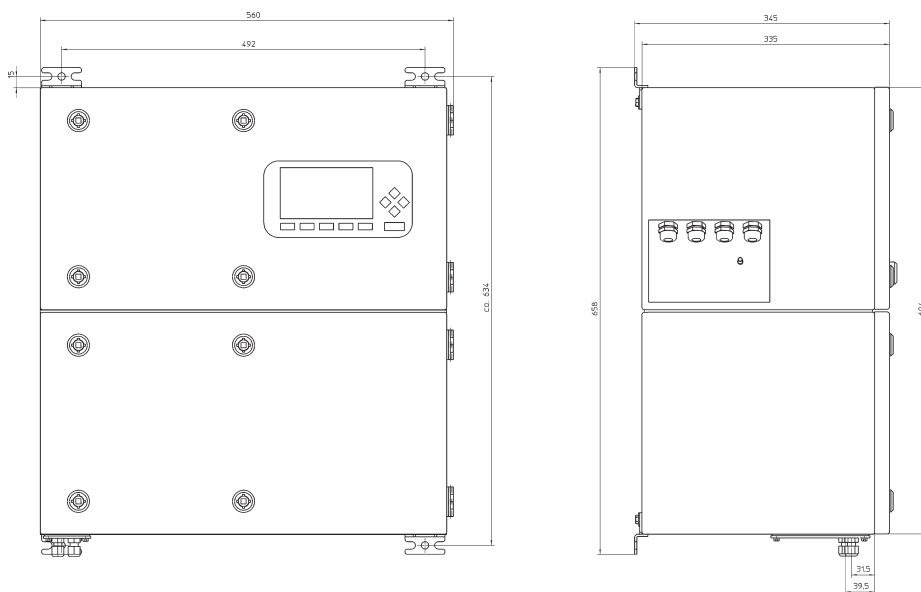
with Category 3 pressurization system

**Fig. 2-1b**  
Single enclosure analyzer (dimensions in mm)

**MLT 2 / BINOS® 100 F**

**2-3-2 Dual Enclosure Analyzer**

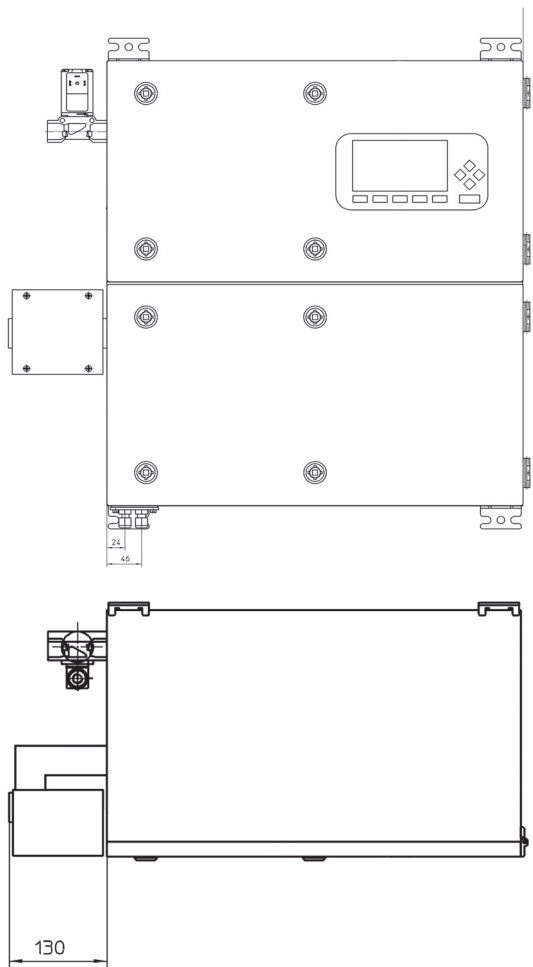
**2-3-2 Dual Enclosure Analyzer**



Standard version w/o pressurization system

**Fig. 2-2a**  
Dual enclosure analyzer (dimensions in mm)

**2-3-2 Dual Enclosure Analyzer**



with Category 3 pressurization system

**Fig. 2-2b**  
Dual enclosure analyzer (dimensions in mm)

MLT 2 / BINOS<sup>®</sup> 100 F**2-4 Connection of Sample Gas and Protective Gas (Purge Gas)****2-4 Connection of Sample Gas and Protective Gas (Purge Gas)**

When the analyzer with assembled EEx p safety device has been fixed, connect the gas lines according the diagram (fig. 2-3). The following conditions must be observed for trouble free operation:

- The operator must ensure the minimum pressure of the protective gas at the point of installation.  
A pressure of **3,000 ... 4,000 hPa** (3...4 bar) must be applied to the protective gas inlet of the EEx p safety device.

- The EEx safety device is delivered with fixed basic parameters. The minimum purge gas pressure is preset to 14 mbar. Useful modifications such as increasing the max. purge gas pressure must only be done after studying the appropriate sections of the manual of the EEx p safety device.
- Flammable sample gas must not be supplied to the analyzer until the pre-purging phase has ended.

**2-4-1 Hints on Flammable Gases**

**2-4-1 Hints on Flammable Gases**

- When applying flammable gases (either as sample gas or span gas) the corresponding gas inlets and outlets must be equipped with flame arrestors.
- To avoid internal release of flammable gases the minimum pressure specified for the pressurized enclosure is at least 50 Pa higher than the maximum pressure specified for the containment system. A differential pressure switch is provided with the system to operate if the pressure difference falls below 50 Pa.



**The 50 Pa limit is the value defined by the associated standards. It is not allowed to decrease this value but higher values are allowed and may be set dependent on the application and differential pressure switch used.**

**WARNING**

**The purpose(s) for which the differential pressure switch is used (i.e. to activate disconnection of power or to sound an alarm or otherwise maintain the safety of the installation) is the responsibility of the user!**

**WARNING**

**Take care of the possible formation of flammable mixtures due to the possibility of air penetration into the containment system and the resulting additional precautions that may be necessary.**

# MLT 2 / BINOS® 100 F

## 2-4-2 MLT 2 Gas Flow Diagrams

### 2-4-2 MLT 2 Gas Flow Diagrams

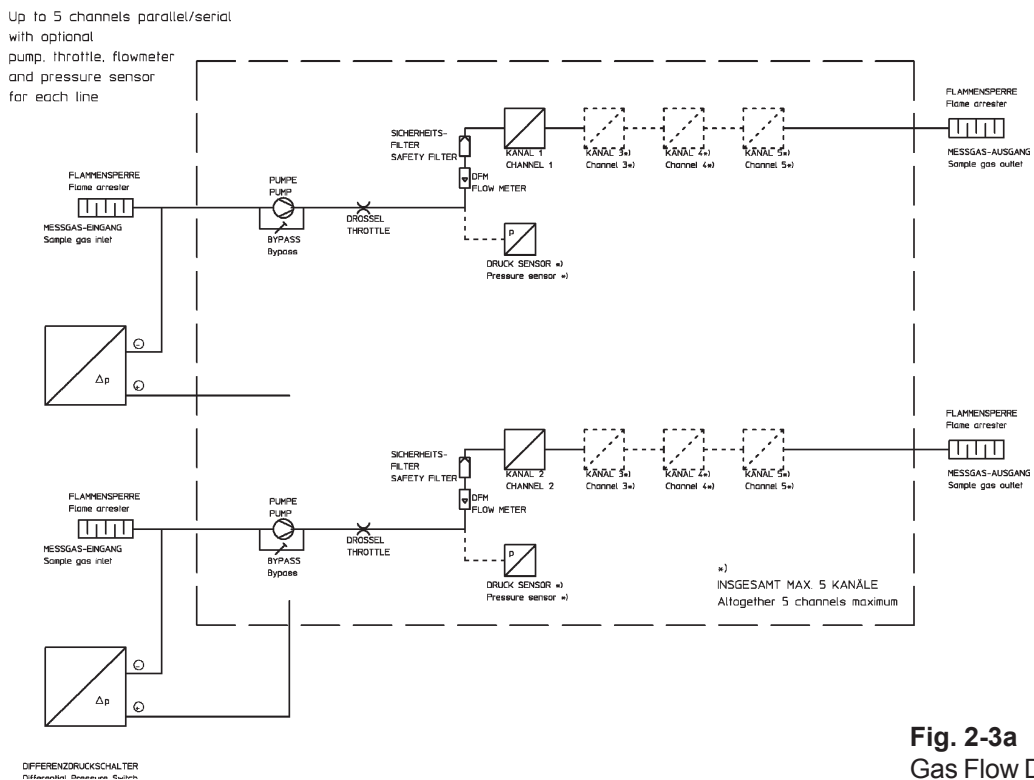
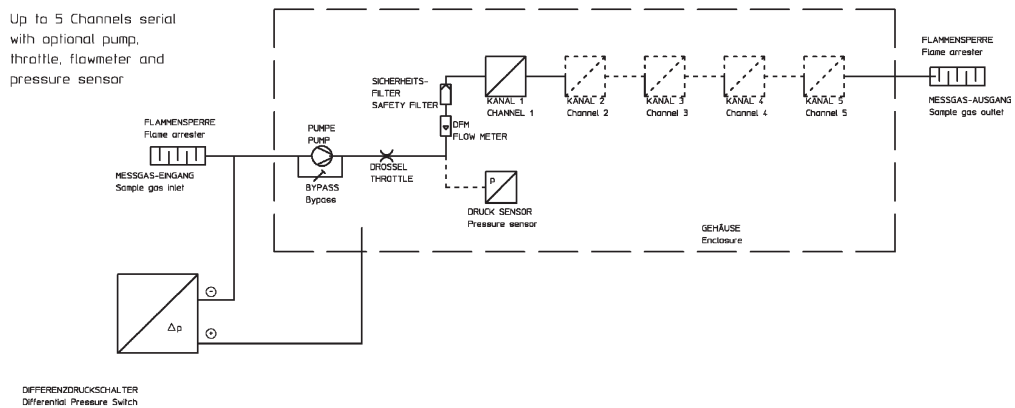


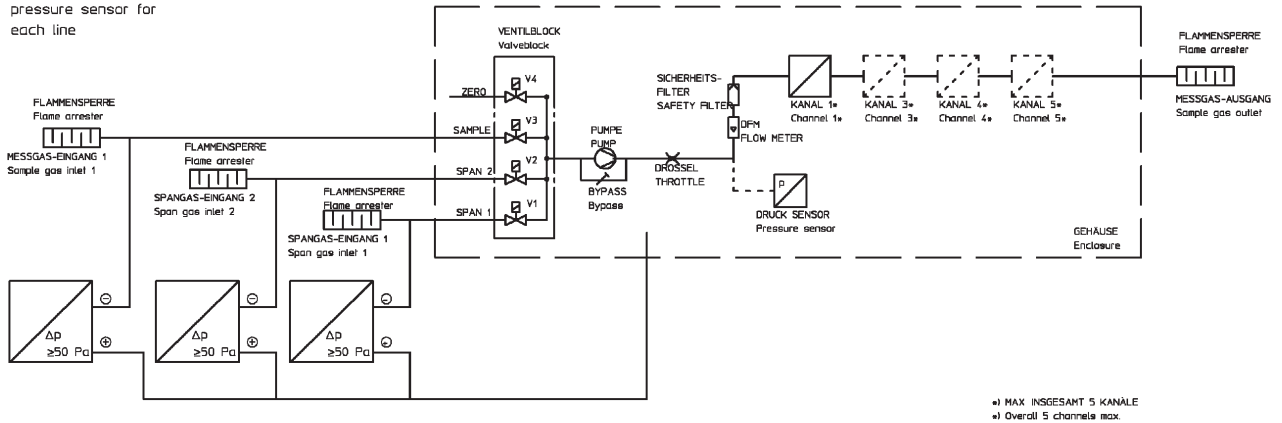
Fig. 2-3a  
 Gas Flow Diagram



**2-4-2 MLT 2 Gas Flow Diagrams**

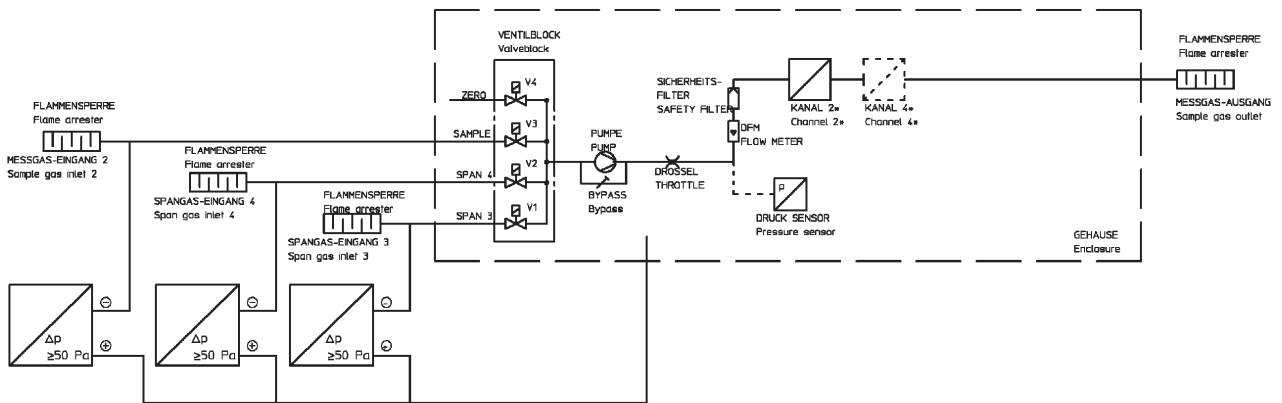
**2-4-2 MLT 2 Gas Flow Diagrams (cont'd)**

Up to 5 Channels serial/parallel  
 with optional pump,  
 throttle, flowmeter and  
 pressure sensor for  
 each line



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Differential Pressure Switches  
 For span gases only if these are combustible, too!



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**Fig. 2-3b**  
 Gas Flow Diagram

MLT 2 / BINOS® 100 F

2-4-3 BINOS® 100 F Gas Flow Diagrams

2-4-3 BINOS® 100 F Gas Flow Diagrams

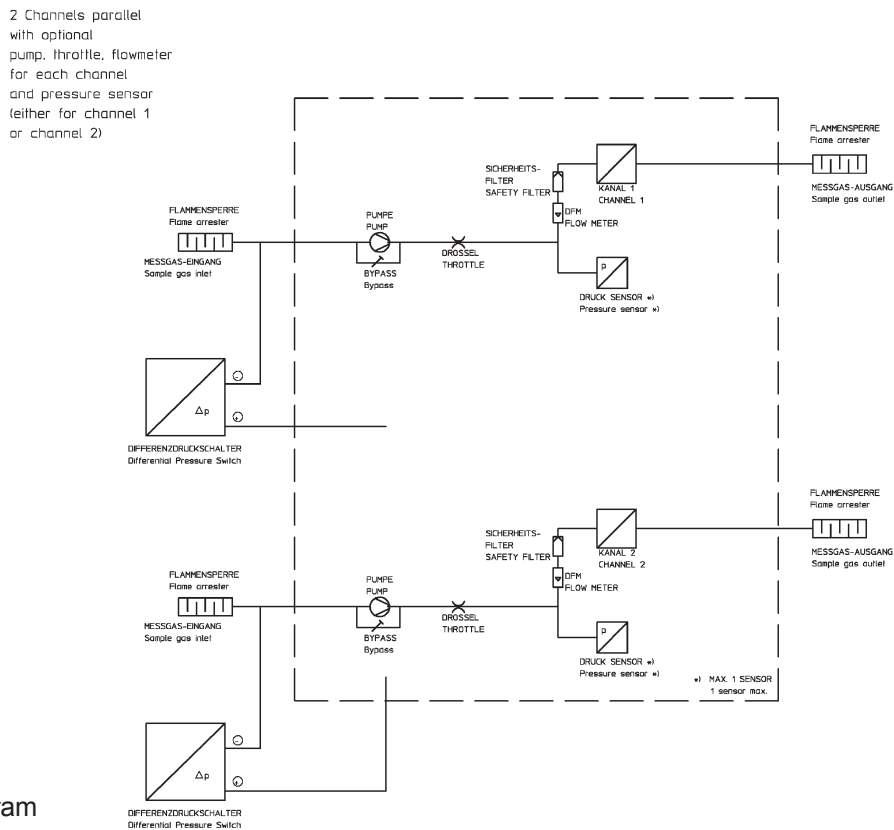
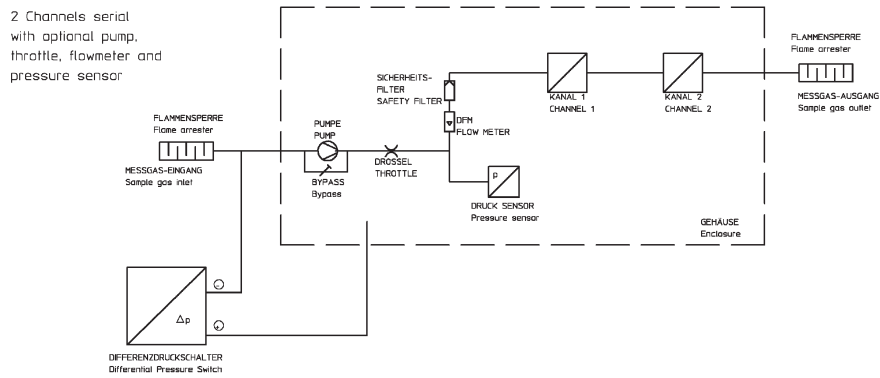
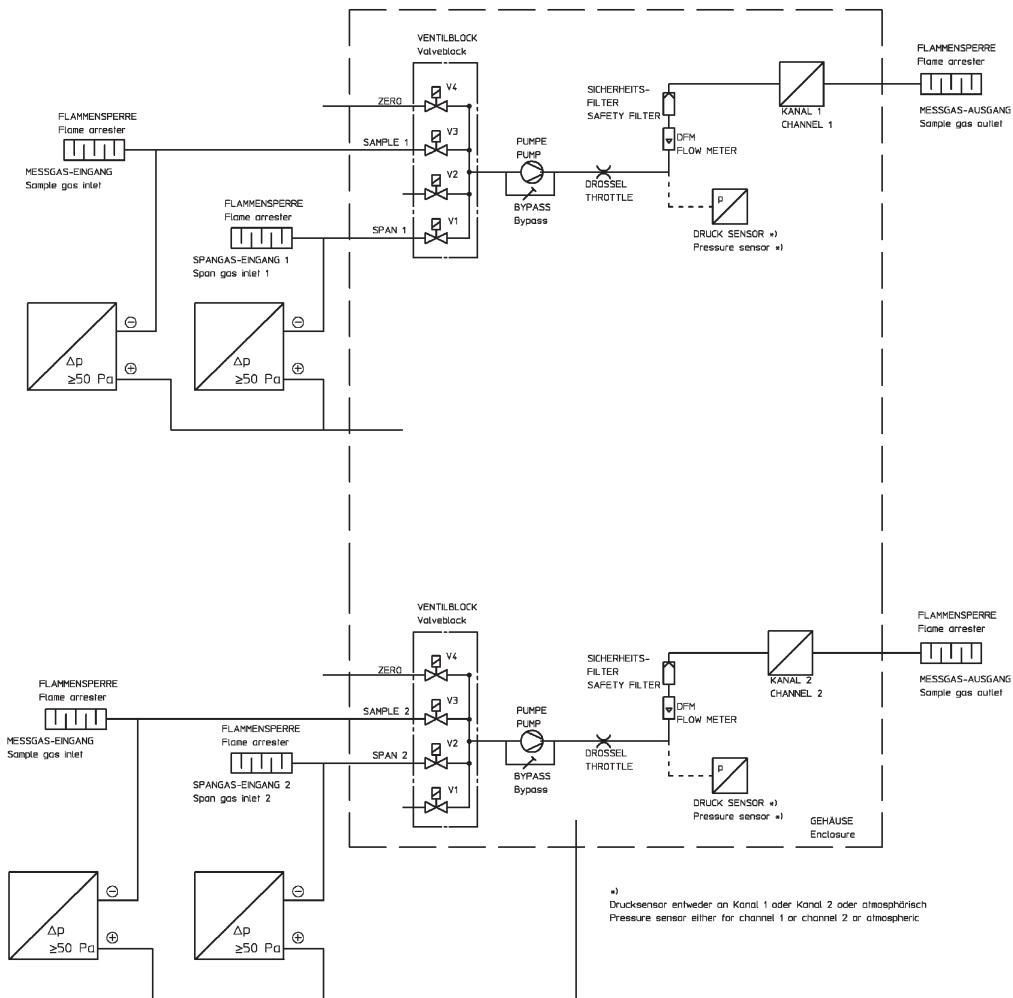


Fig. 2-3c Gas Flow Diagram

**2-4-3 BINOS® 100 F Gas Flow Diagrams**

**2-4-3 BINOS® 100 F Gas Flow Diagrams (cont'd)**

2 Channels parallel  
with optional  
pump, throttle, flowmeter  
for each channel  
and pressure sensor  
(either for channel 1  
or channel 2)



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Differential Pressure Switches  
For span gases only if these are combustible, too!

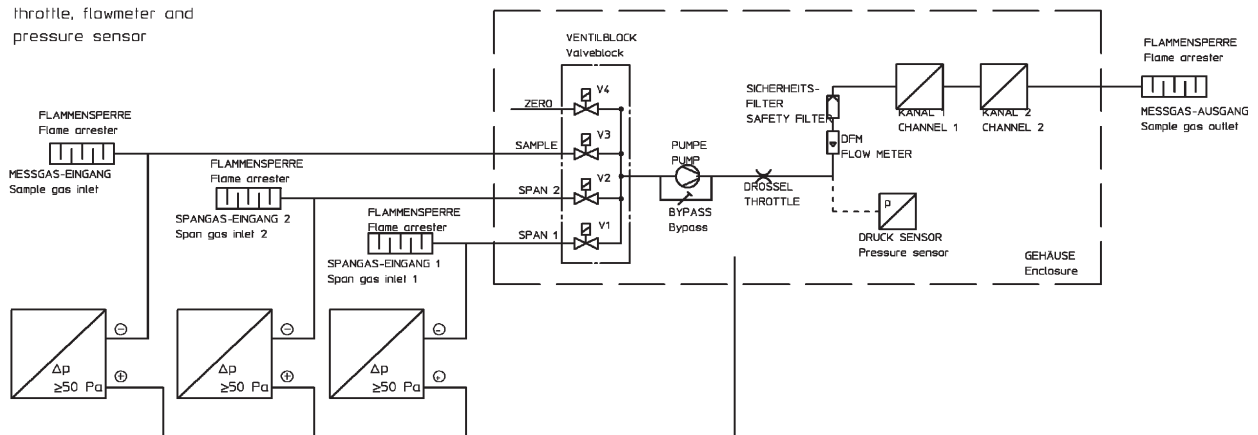
**Fig. 2-3d**  
Gas Flow Diagram

## MLT 2 / BINOS® 100 F

## 2-4-3 BINOS® 100 F Gas Flow Diagrams

## 2-4-3 BINOS® 100 F Gas Flow Diagrams

2 Channels serial  
with optional pump,  
throttle, flowmeter and  
pressure sensor



DIFFERENZDRUCKSCHALTER  
FÜR SPANGASE NUR, WENN DIESE SELBST AUCH BRENNBAR SIND!

Differential Pressure Switches  
For span gases only if these are combustible, too!

**Fig. 2-3e**  
Gas Flow Diagram

**2-5 Safety Device Settings**

**2-5 Safety Device Settings**

The EEx safety device is delivered with fixed basic parameters. The purge gas pressure is preset to 14 hPa (rel.; for flammable gases). Useful modifications such as increasing the max. purge gas pressure must only be done after studying the appropriate sections of the manual of the EEx p safety device.

As the parameters are selected to be in conformance with the type test results, some of them are not allowed to be changed! This applies to the pre-purge time, which is adjusted to ensure a 5 times volume exchange within the analyzer enclosure at a preset purge medium flow!

**2-6 Special Remarks and Instructions**



**It is not allowed to change the internal purge medium path.**

The pressurization system is provided with a bypass function to switch off the automatic monitoring facility. It is therefore also possible to switch on the pressurized system with the housing door open for setting work resp. to keep the analyzer powered even if the front door is opened.

**The use of this function is intended for maintenance purposes only!**



**This facility should however only be used when it has been ascertained that there is no explosive atmosphere in the vicinity of the unit (fire safety certificate).**

When maintenance work has been finished is has to be verified that the bypass is turned off!

The pressurization system M code, preset to 0001, must be replaced by an individual code which must then be entered.

The pressurization system by-pass code, preset to 0002, should for safety reasons be replaced by an individual code, unequal Zero.

## MLT 2 / BINOS® 100 F

## 2-7 Electrical Connections

## 2-7 Electrical Connections

**WARNING**

Installation of and connecting the power supply lines and signal lines is permitted to qualified personnel only!

The standard EN 60079-14 „Electrical Installations in Hazardous Areas“ and all related standards have to be observed.

Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.

- All connections have to be done according to the schematics delivered together with the equipment.
- A mains switch or circuit-breaker must be provided at the building installation.
- The equipment enclosure must be connected to an earthing or equipotential bonding conductor.
- All cables introduced into the enclosure must be kept as short as possible.
- The cable glands are designed to fix single cables only, with diameters from 7 to 12 mm.
- Use only shielded cables for signal lines! To ensure proper electromagnetic compatibility (EMC) it is recommended to follow the installation steps given below.

## 2-7-1 Cable Gland Assembly Instruction for Sh



1. Strip the cable insulation
2. Uncover the shielding



3. Feed cable through gland nut and into fixing element
4. Put the shielding net over the element the way that it covers the o-ring 2 mm.



5. Stick the fixing element into the neck and fix the gland.

**2-7-2 Mains Connection**

**2-7-2 Mains Connection**

Recommended standard mains connection is done by using separate cords for analyzer and pressurization system.

This configuration allows to activate the safety device independently from the analyzer to purge the analyzer enclosure before switching on.



**In case of pressurization failure the analyzer will not be shut off!**

**If automatic shut off is required an external switch (relay), additional wiring and use of alarm contacts is needed!**

**2-7-2-1 Purge System**

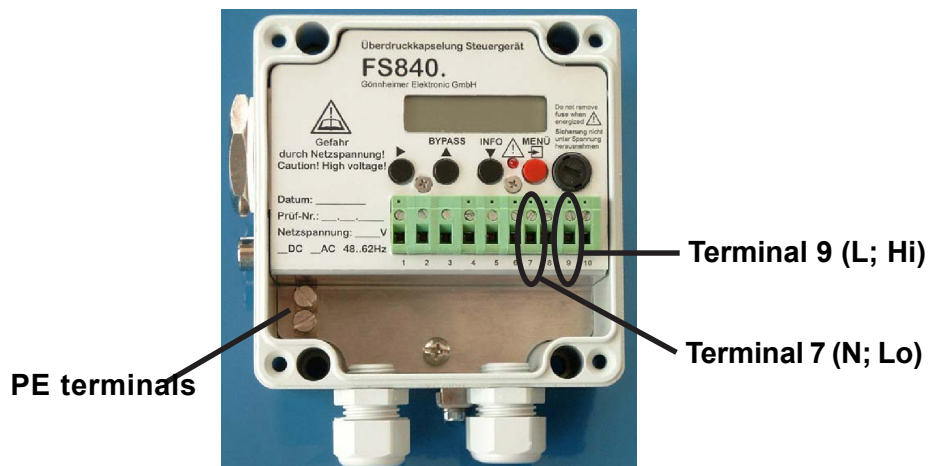
Remove the pressurization system control unit's cover.

The mains power line cord has to be connected to the terminals 7 (N) and 9 (L) , the PE conductor is connected to separated terminals in the lower left corner of the enclosure (fig. 2-4).



**Verify that the mains voltage at the point of installation meets the system nominal voltage!**

**Re-install the cover!**



**Fig. 2-4**  
Terminal location pressurization system control unit

MLT 2 / BINOS<sup>®</sup> 100 F

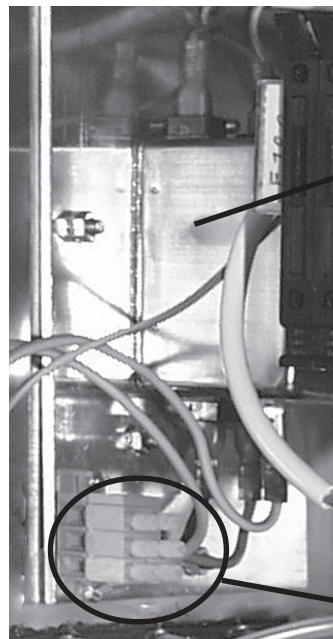
## 2-7-2 Mains Connection

## 2-7-2-2 Analyzer

The mains power line cord has to be connected to the terminals provided at the analyzer enclosure's inner left side, near the EMC line filter (fig. 2-5).



**Verify that the mains voltage at the point of installation meets the analyzer nominal voltage!**



EMC line filter

Terminals

**Fig. 2-5**

Terminal location inside analyzer

By default the analyzer has to be supplied separately to the pressurization unit. This

allows to shut on the safety device for pre-purging the analyzer, while this is still shut off!

### Omitting the pre-purge sequence

The pre-purging sequence can be refrained if it is ensured that at the moment of activating the analyzer the atmosphere inside the enclosure and the appropriate pipes is well below 25 % LEL.



**It is the responsibility of the user to omit pre-purging!**



**2-7-3 Pressurization System Alarm Contacts**

In this case the analyzer mains cord may be connected to terminals 8 (L), 10 (N) and PE of the pressurization unit instead of connecting it to a mains outlet. So only one single outlet is required for the system.

In each case applies:



**In case of pressurization failure the analyzer will not be shut off!**

**If automatic shut off is required an external switch (relay), additional wiring and use of alarm contacts is needed!**

**2-7-3 Pressurization System Alarm Contacts**

The pressurization control unit provides alarm contacts which are widely programmable.

Refer to the unit's instruction manual for information about available options and how to setup the contacts.

**WARNING**

**The purpose(s) for which the alarm contacts are used (i.e. to activate disconnection of power or to sound an alarm or otherwise maintain the safety of the installation) is the responsibility of the user!**

## MLT 2 / BINOS® 100 F

## 2-7-4 Differential Pressure Switch(es)

**2-7-4 Differential Pressure Switch(es)**

The contact of the differential pressure switch is connected to terminals X30 installed inside the analyzer.

The contact opens if the differential pressure decreases below 50 Pa.

To use this alarm contact the user must connect his external monitoring system to these terminals.

Refer to the schematics in appendix to see how to connect the switch.



**The contacts must be connected to signal circuitry (amplifier, relay) providing output signals according NAMUR resp. EN 50227 only. The standard specifies all essential data and operating conditions.**

**Consult factory for applicable circuitry which is available from various manufacturers.**

**CAUTION**

It is the responsibility of the user to connect other circuitry than specified for scanning the differential pressure switch.

Take into account the risk of igniting flammable gas by sparking contacts!

**WARNING**

**The purpose(s) for which the differential pressure switch is used (i.e. to activate disconnection of power or to sound an alarm or otherwise maintain the safety of the installation) is the responsibility of the user!**

## SECTION 3 Startup

### **WARNING**

**Startup can only be done properly by personnel being familiar with the contents of all applicable manuals and related instructions!**

**Especially the warnings provided by the documentation have to be observed!**

### 3-1 Final Check

Make sure that the analyzer and the related pressurization system have been setup as described in section 2 and all covers and doors are closed and fixed.

All unused cable glands need to be sealed using the supplied approved sealing plug (part no. ETC00791; fig. 3-1)

Unused cable gland openings in the enclosure need to be covered using a special screw (part no. ETC 000790; fig. 3-2).



**Fig. 3-1**  
Cable gland sealing plug

### **WARNING**

**Use only the components listed above as these are ATEX approved for use in hazardous areas!**



**Fig. 3-2**  
Cable gland hexagon socket screw sealing plug

### 3-2 Switching On

In a next step the analyzer may be powered by opening the purge gas supply and switching on the power supply.



## **SECTION 4 Maintenance**

### **WARNING**

**After maintenance or replacement of parts concerning explosion protection an authority on explosion protection has to verify that the analyzer still meets the requirements for explosion protection before it is switched on again.**

**If parts essential for explosion protection are repaired they have to be routine tested!**

**The authority has to issue a certificate for this and/or attach a test label to the equipment before startup after maintenance or replacement of parts.**

#### **4-1 Maintenance Interval**

To ensure the performance and safety of the equipment it has to be checked on a regular basis, at least once a year. Special care has to be taken for the EEx p safety device and parts ensuring explosion protection (e.g. gaskets).



**It is the operators/owners responsibility to extend the maintenance interval with respect to negative influences of gases or environment on materials in contact with the sample gas or ensuring explosion protection (e.g. gaskets).**

#### **4-2 Gasanalyzer**

Refer to the associated manual for detailed information on maintenance, replacement of parts and how to carry out a containment system leak test.

### 4-3 Pressurization Systems and Other Additional Equipment

Refer to the associated manuals for detailed information on maintenance and replacement of parts.

### 4-4 Verifications and Tests on Modified or Repaired Electrical Apparatus

Modifications made on the electrical apparatus affecting the integrity of the type of protection or the temperature of the apparatus shall be permitted only if the modified apparatus is resubmitted to a testing station.

In the case of repairs of electrical apparatus affecting the type of protection, the parts which have been repaired should be subjected to new routine verifications and tests. These tests need not necessarily be made by the manufacturer.

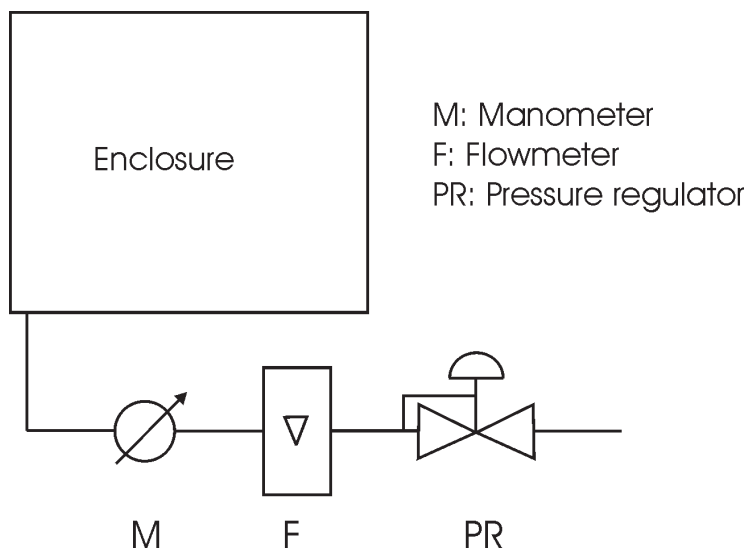
#### 4-4-1 Preparations

To do the routine tests the following steps have to be performed:

- Disconnect the analyzer and the pressurization unit from power.
- Seal the purge medium outlet at the pressurization unit (1" opening at the left side).
- Disconnect the containment system gas connectors from the external gas lines.
- Disconnect one of the containment system gas connectors inside the analyzer and seal the other one.

(Remark: Now it must be possible set the enclosure under pressure by applying an external gas (e.g. compressed air) to the gas connector.)

- Connect an external source of compressed air as described in the drawing on the next page (fig. 4-1). The manometer needs to have a measuring range of 50 to 100 mbar with a resolution of 0.1 mbar. The flowmeter needs to have a measuring range of 10 l/min, resolution 0.1 l/min.



**Fig. 4-1**  
Setup for routine tests

#### 4-4-2 Overpressure Test

A pressure of 37.5 mbar (= 1.5 times the maximum overpressure specified) has to be applied to the pressurized enclosure. To do this the following has to be performed:

- Carefully apply a pressure of 37.5 mbar to the enclosure and hold this pressure for a period of 2 minutes +/- 10 seconds.

The test is considered to be satisfactory if no permanent deformation occurs which would invalidate the type of protection.

Keep the modifications to carry out the leakage test (sec. 4-4-3).

#### 4-4-3 Leakage Test

The leakage of the enclosure has to be measured with an overpressure of 25 mbar applied to the pressurized enclosure. To do this the following steps have to be performed:

- Make sure the modifications as described in the section 4-4-1 are still existent.
- Apply an overpressure of 25 mbar to the analyzer enclosure and take the reading of the flow meter.

The test is considered to be satisfactory if the measured value is acceptable compared to the following values.

Acceptable flow values are:

- all analyzers: 3 l/minute maximum



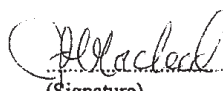
#### **4-4-4 Removal of Modifications**

Remove all the modifications described in section 4-4-1. Take special care of the gas connections to be tightend.



**APPENDIX**

**A-1 Declarations**

<b>ROSEMOUNT</b> Analytical	<b>Declaration of the Manufacturer</b>	 <b>EMERSON</b> Process Management
	according to the Directive 94/9/EC	
We,	<b>Emerson Process Management Manufacturing GmbH &amp; Co. OHG</b>	
located at	Industriestraße 1, D-63594 Hasselroth, Germany	
declare under our sole responsibility that the equipment described below complies with the basic safety and health requirements of the EC directive 94/9/EC concerning design, construction and placing on the market.		
<b>Equipment covered by this declaration</b>		
<b>Description:</b>	Gas analyzer with Zone 2 pressurization system F 840	
<b>Types :</b>	MLT 2, single or dual enclosure BINOS 100 F, single enclosure	
<b>Protection Concept:</b>	Simplified pressurization system marked II 3 G EEx nAC [P] IIC T6 II 3 G EEx nAC [P] IIC T5 Ex nAC [pz] IIC T6 Ex nAC [pz] IIC T5 TÜV 03 ATEX 2095 X in combination with internal differential pressure monitoring (containment without release)	
<b>Marking of the overall system:</b>	Ⓔ II 3 G EEx nP IIC T4  Emerson Process Management Manufacturing GmbH & Co. OHG Industriestraße 1 D-63594 Hasselroth Germany Type: ... Serial number Year of construction	
	<i>For types BINOS 100 F &amp; MLT 2 (Single enclosure):</i> Internal free volume : 56,1 L Minimum purging flow rate : 8 Nm³/h Minimum purging duration : 5 min Minimum overpressure of the enclosure : 1 mbar Maximum leakage flow rate : 22 Nm³/h Maximum overpressure : 25 mbar	<i>For type MLT 2 (Dual enclosure):</i> Internal free volume : 112 L Minimum purging flow rate : 7 Nm³/h Minimum purging duration : 17 min Minimum overpressure of the enclosure : 1 mbar Maximum leakage flow rate : 22 Nm³/h Maximum overpressure : 25 mbar
 Purging may be omitted if inner atmosphere is below 25 % LEL. <b>DO NOT OPEN IN PRESENCE OF HAZARDOUS ATMOSPHERE</b>		
Hasselroth, Nov 2003, 6	 (Signature)	
	Ian Macleod, VP Sales & Marketing EMA (Name) (Function name)	
<b>This declaration becomes invalid if the equipment is changed without our written permission.</b>		

A-1 Declarations

EC DECLARATION OF CONFORMITY

Document number: RAE/MLT 2-ATEX-E2 Flammable Gases
Date: 2004, June

We,

Emerson Process Management
Manufacturing GmbH & Co. OHG

located at

Industriestraße 1, D-63594 Hasselroth, Germany

declare under our sole responsibility that our gas analyzer, type

MLT 2 with pressurized enclosure

to which this declaration relates is in accordance with the provisions of:

89/336/EEC EMC Directive (changed by directive 91/263/EEC 92/31/EEC and 93/68/EEC)
with the application of the harmonized standards:
EN 61326-1:1997 + A1:1998+A2:2001 + A3:2003

94/9/EC Equipment and protective systems in potentially explosive atmospheres
with the application of the harmonized standards:
EN 50014:1997 + A1 + A2, EN 50016:1995, EN 50021:2000

97/23/EC Pressure Equipment Directive
This analyzer has been designed and manufactured considering Sound Engineering
Practice and article 3, paragraph 3 of the above mentioned directive and therefore CE
marking does not refer to this directive.

The standards published in the EC's OFFICIAL JOURNAL with reference to directive 73/23/EC
(e.g. EN 61010) have been used to fulfill 1.2.7 of Annex II of directive 94/9/EC to eliminate electrical
risks.

This declaration relates to series MLT 2 analyzers with pressurized enclosure intended to be used at
hazardous locations of Zone 2 to measure flammable gases. MLT 2 does include any field housing
(single or dual compartment) based on NGA analyzers.

Hasselroth, 6/30/2004

[Handwritten Signature]

(Signature)

Ian Macleod
(Name)

VP Sales & Marketing EMA
(Function name)

This declaration confirms the compliance with announced directives but does not include the assurance of properties.
The safety and installation instructions of the documentation have to be followed.

**A-1 Declarations**

**EC DECLARATION OF CONFORMITY**

Document number: RAE/BINOS 100 F-ATEX-E2 Flammable Gases

Date: 2004, June

We,

**Emerson Process Management  
Manufacturing GmbH & Co. OHG**

located at

Industriestraße 1, D-63594 Hasselroth, Germany

declare under our sole responsibility that our gas analyzer, type

**BINOS 100 F with pressurized enclosure**

to which this declaration relates is in accordance with the provisions of:

---

**89/336/EEC EMC Directive** (changed by directive 91/263/EEC 92/31/EEC and 93/68/EEC)  
with the application of the harmonized standards:  
EN 61326-1:1997 + A1:1998+A2:2001 + A3:2003

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**94/9/EC Equipment and protective systems in potentially explosive atmospheres**  
with the application of the harmonized standards:  
EN 50014:1997 + A1 + A2, EN 50016:1995, EN 50021:2000

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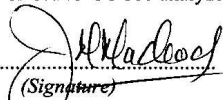
**97/23/EC Pressure Equipment Directive**  
This analyzer has been designed and manufactured considering Sound Engineering Practice and article 3, paragraph 3 of the above mentioned directive and therefore CE marking does not refer to this directive.

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The standards published in the EC's OFFICIAL JOURNAL with reference to directive 73/23/EC (e.g. EN 61010) have been used to fulfill 1.2.7 of Annex II of directive 94/9/EC to eliminate electrical risks.

This declaration relates to series BINOS 100 F analyzers with pressurized enclosure intended to be used at hazardous locations of Zone 2 to measure flammable gases. BINOS 100 F does include any field housing based on BINOS 100(M), Hydros 100 or OXYNOS 100 analyzers.

Hasselroth, 6/30/2004



(Signature)

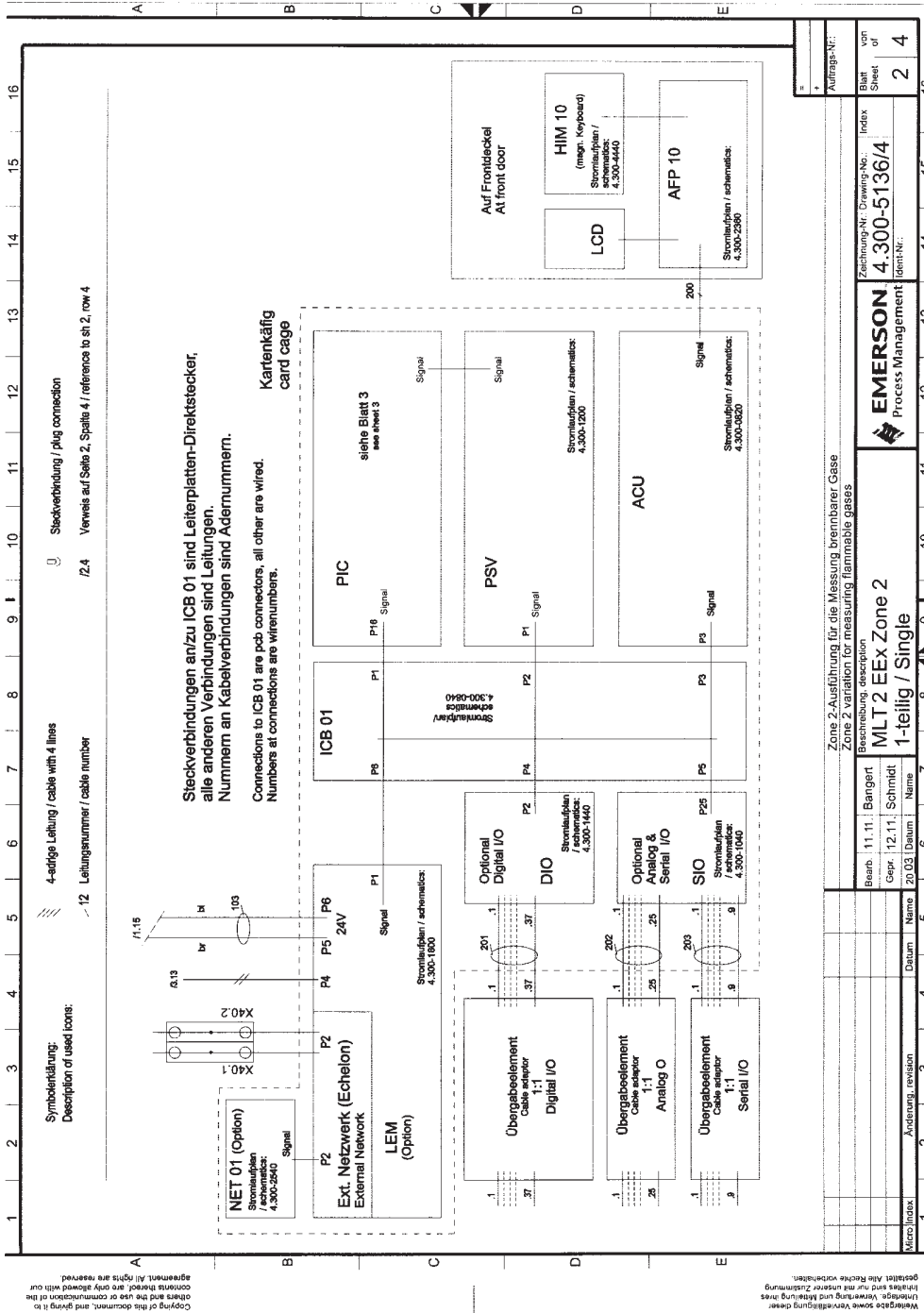
Jan Macleod  
(Name)

VP Sales & Marketing EMA  
(Function name)

This declaration confirms the compliance with announced directives but does not include the assurance of properties.  
The safety and installation instructions of the documentation have to be followed.

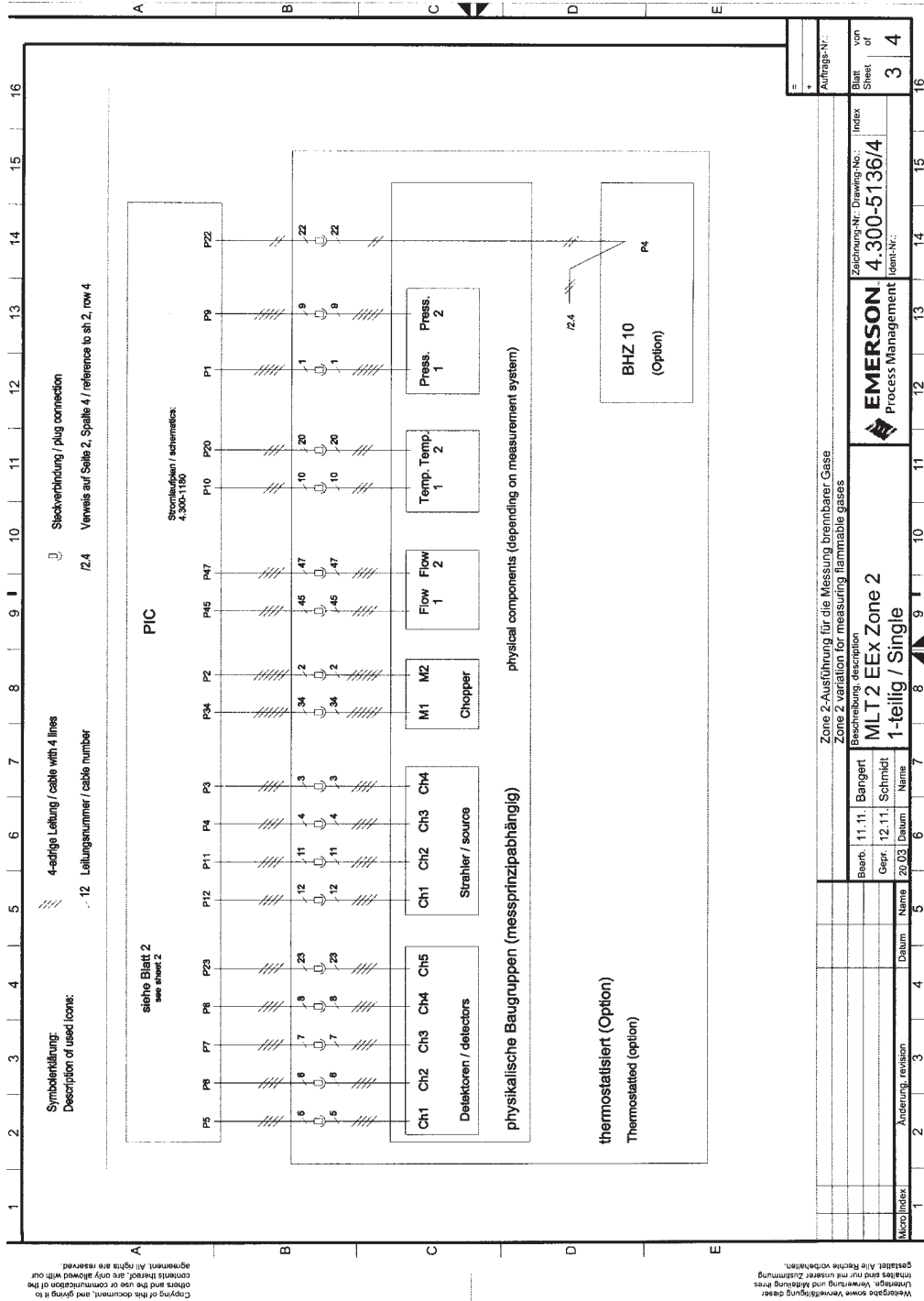


**A-2-1 MLT 2 Circuit Diagrams**

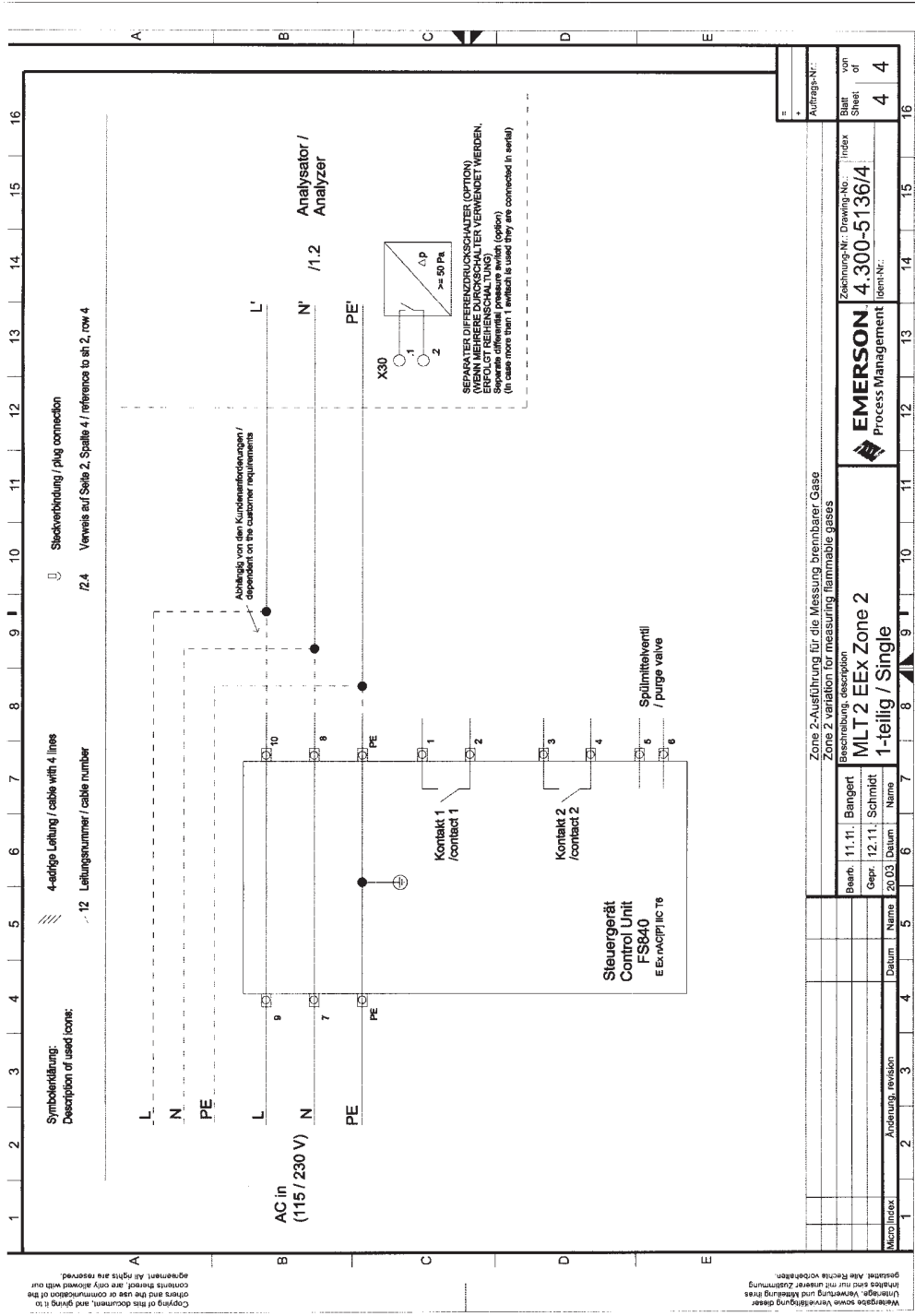


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A-2-1 MLT 2 Circuit Diagrams

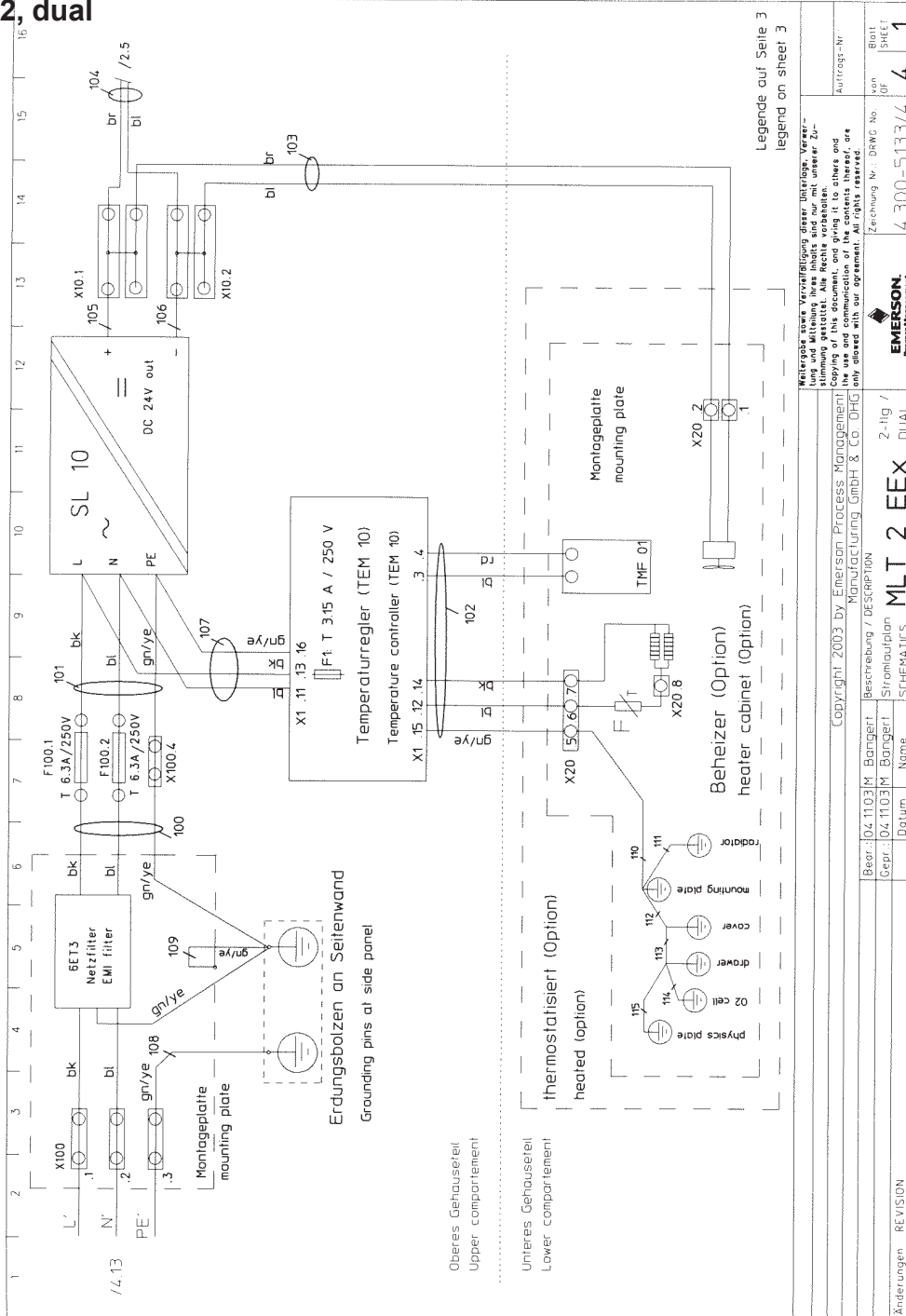


A-2-1 MLT 2 Circuit Diagrams



A-2-2 MLT 2 Circuit Diagrams

A-2-2 MLT 2, dual



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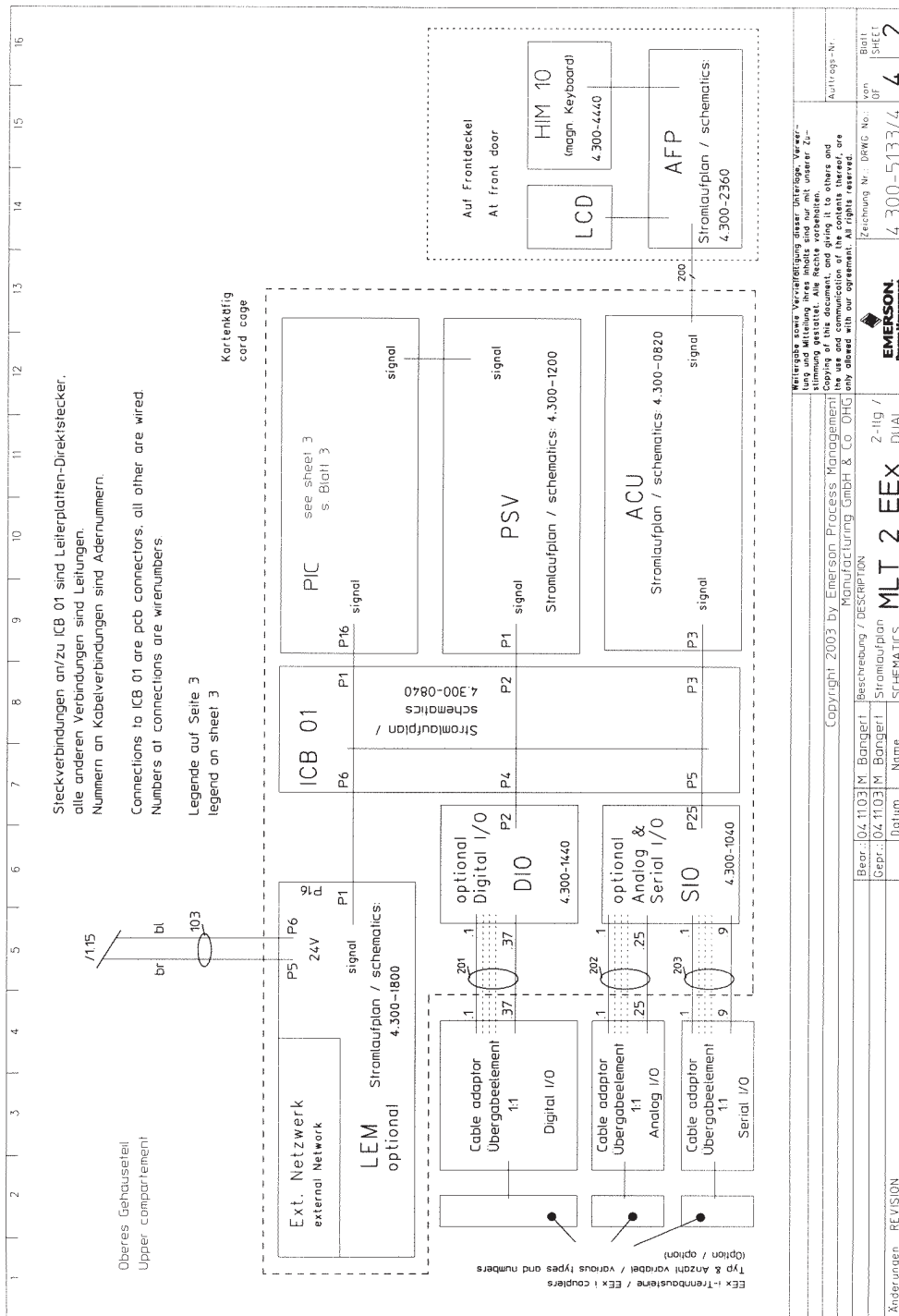
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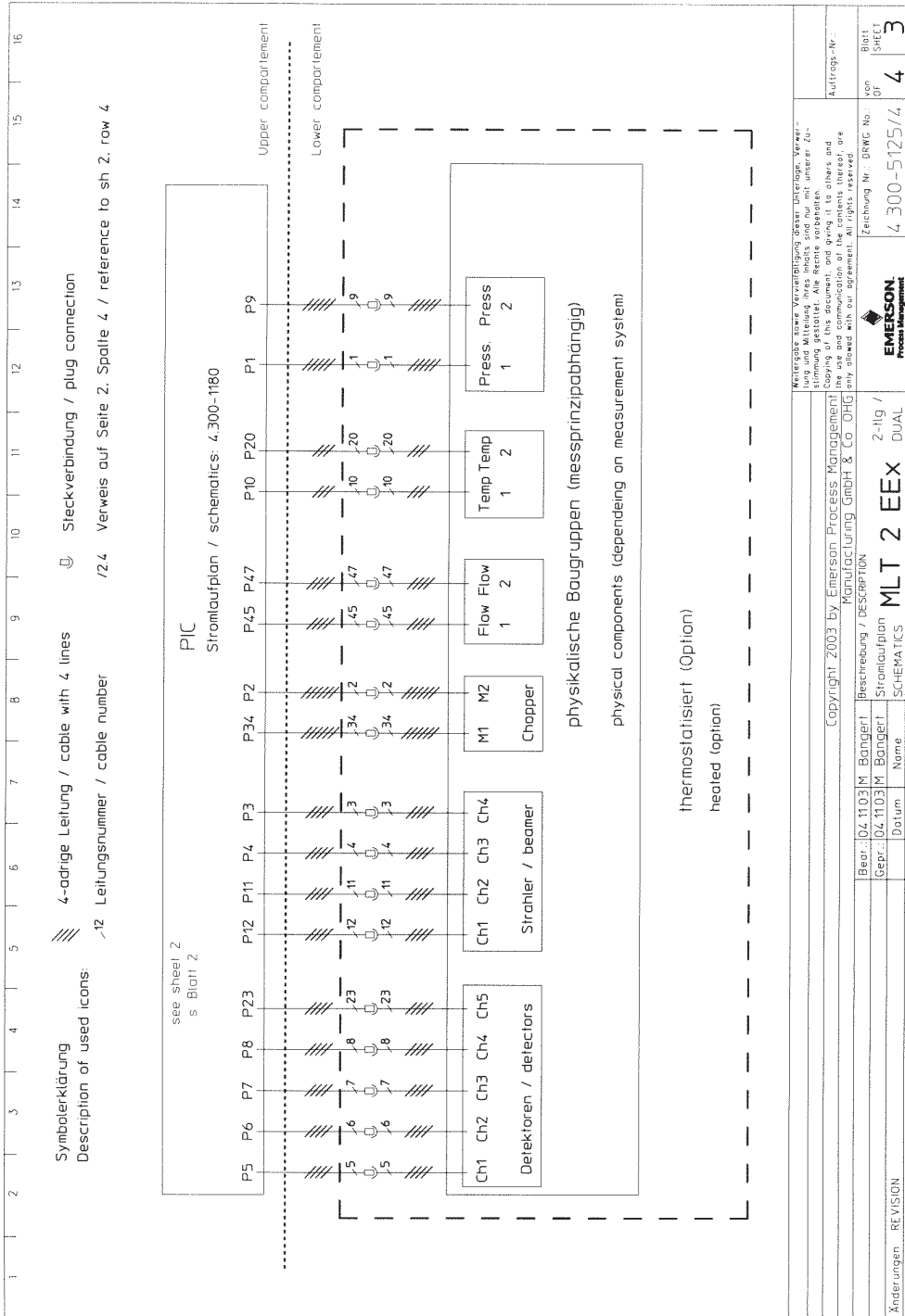
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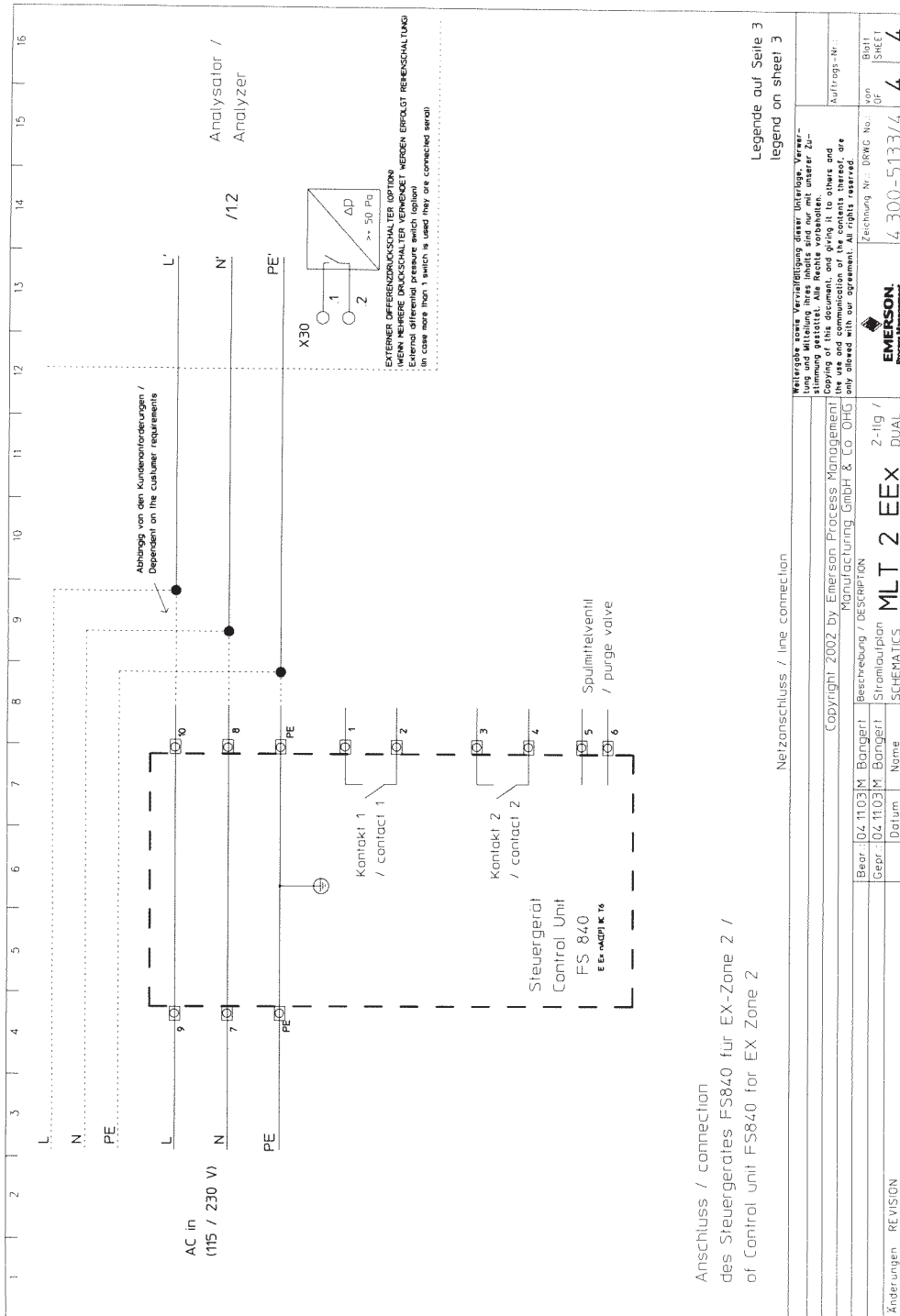
**A-2-2 MLT 2 Circuit Diagrams**



A-2-2 MLT 2 Circuit Diagrams

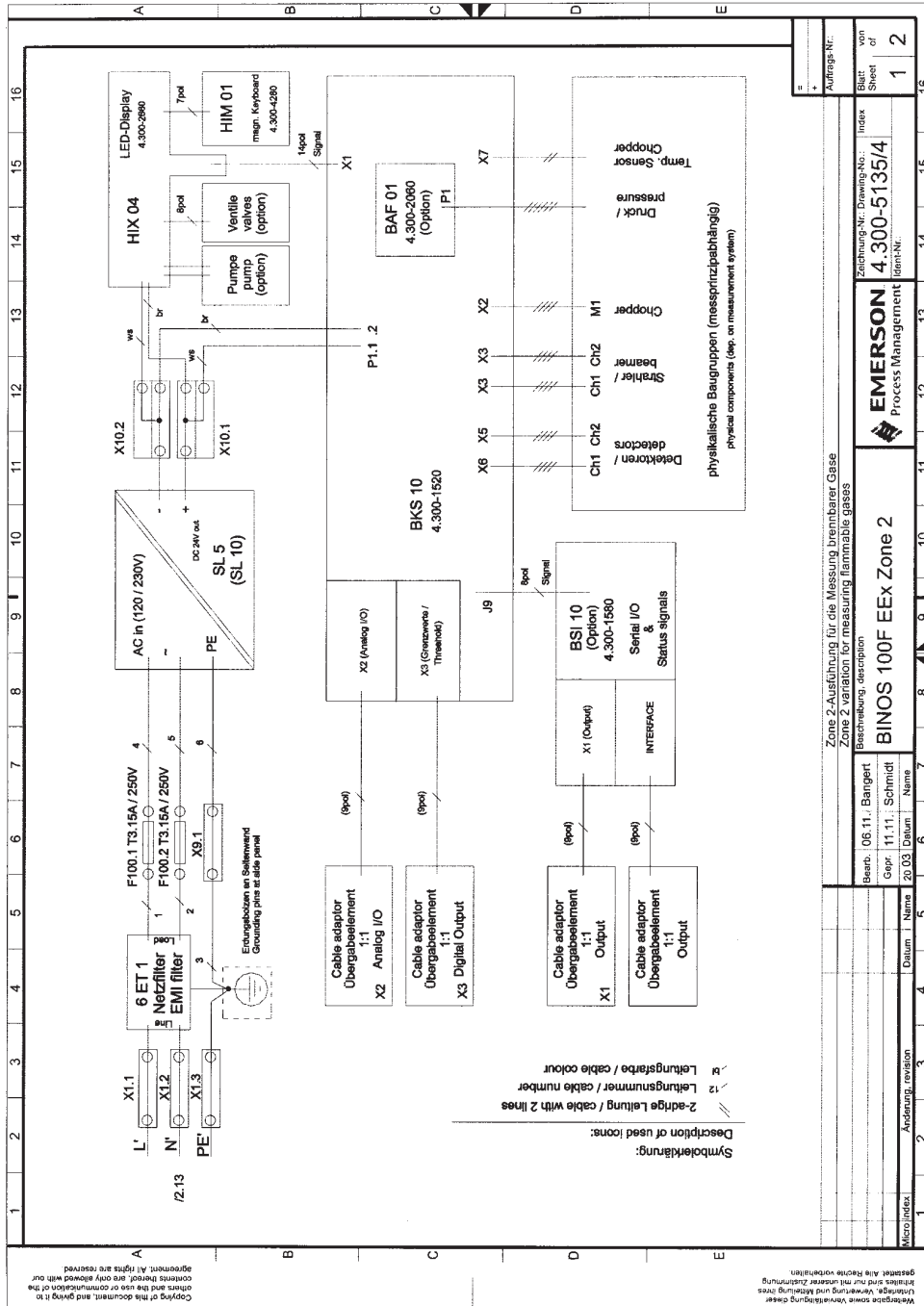


**A-2-2 MLT 2 Circuit Diagrams**

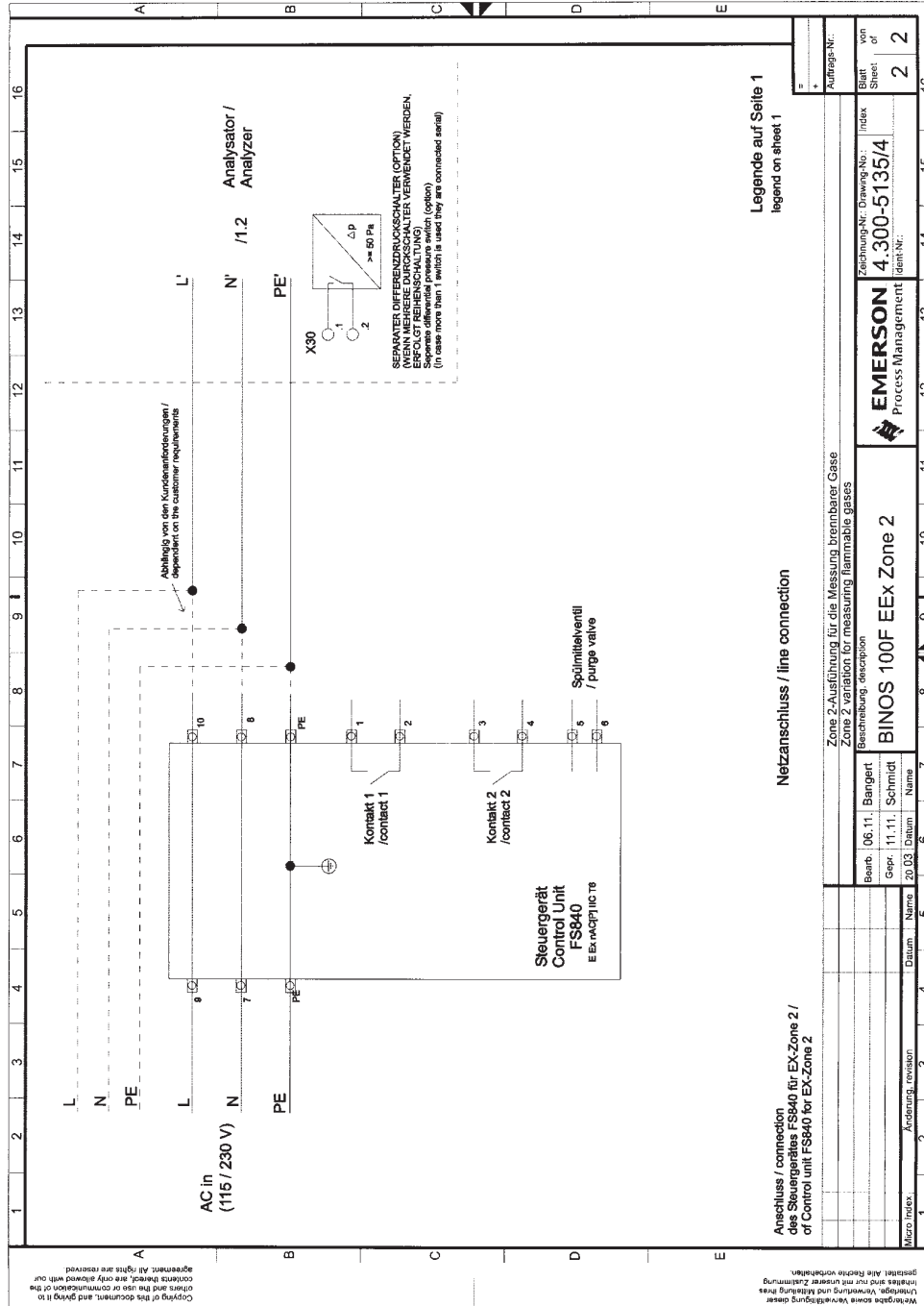


A-2-2 BINOS® 100 F Circuit Diagrams

A-2-3 BINOS® 100 F



A-2-2 BINOS® 100 F Circuit Diagrams



# BINOS 100 F & MLT 2 Addendum Zone 2

**Instruction Manual**

HAS8xE-IM-ATEX

08/2004

## **WORLD HEADQUARTERS**

### **ROSEMOUNT ANALYTICAL EUROPE**

#### **Emerson Process Management**

#### **GmbH & Co. OHG**

Industriestrasse 1

63594 Hasselroth

Germany

T 49 6055 884 0

F 49 6055 884209

#### **Emerson Process Management**

#### **Rosemount Analytical Inc.**

6565 P Davis Industrial Parkway

Solon, OH 44139 USA

T 440.914.1261

Toll Free in US and Canada 800.433.6076

F 440.914.1271

e-mail: [gas.csc@EmersonProcess.com](mailto:gas.csc@EmersonProcess.com)

[www.raihome.com](http://www.raihome.com)

## **GAS CHROMATOGRAPHY CENTER AND LATIN AMERICA**

#### **Emerson Process Management**

#### **Rosemount Analytical Inc.**

11100 Brittmoore Park Drive

Houston, TX 77041

T 713 467 6000

F 713 827 3329

## **EUROPE, MIDDLE EAST AND AFRICA**

#### **Emerson Process Management**

#### **Shared Services Limited**

Heath Place

Bognor Regis

West Sussex PO22 9SH

England

T 44 1243 863121

F 44 1243 845354

## **ASIA-PACIFIC**

#### **Emerson Process Management**

#### **Asia Pacific Private Limited**

1 Pandan Crescent

Singapore 128461

Republic of Singapore

T 65 6 777 8211

F 65 6 777 0947

e-mail: [analytical@ap.emersonprocess.com](mailto:analytical@ap.emersonprocess.com)